
Kappa opioid receptor signaling protects cartilage tissue against posttraumatic degeneration.

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Public Summary:

Osteoarthritis is the most common form of arthritis, and pain relief with opioid-like drugs is a commonly used therapeutic for osteoarthritic patients. Recent studies published by our group showed that the kappa opioid receptor (KOR) is highly expressed during human development in joint-forming cells. However, the precise role of this receptor in the skeletal system remains elusive. The main aim of the current study was to investigate the role of KOR signaling in synovial and cartilaginous tissues in pathological conditions. Our data demonstrate that KOR null mice exhibit accelerated cartilage degeneration after injury when compared with WT mice. Activation of KOR signaling increased the expression of anabolic enzymes and inhibited cartilage catabolism and degeneration in response to proinflammatory cytokines such as TNF- α . In addition, selective KOR agonists increased joint lubrication via the activation of cAMP/CREB signaling in chondrocytes and synovial cells. Taken together, these results demonstrate direct effects of KOR agonists on cartilage and synovial cells and reveals a protective effect of KOR signaling against cartilage degeneration after injury. In addition to pain control, local administration of dynorphin or other KOR agonist represents an attractive therapeutic approach in patients with early stages of osteoarthritis.

Scientific Abstract:

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